

## Preventing Influenza in Children: Vaccination in the Context of Uncertainty

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*“He who watches the wind will not sow and he who looks at the clouds will not reap” (Ecclesiastes 11:4)*

While during an average year, the weather may be ideal, farmers know that some years are far from the average – sometimes it rains too much or too little, or is too cold or too hot – yet every year farmers plant, full of hope, and whether the yield is better or worse, they plant again next year. A similar observation might be made for pediatricians and prevention of influenza. For the large majority of years, there is a good match between the virus strains in the vaccine and what circulates in the community but some years there is not. For most years, vaccine effectiveness data, available toward the middle or end of the influenza season, show good protection but some years they do not. Being unable to predict the influenza season with any more certainty than the farmer can predict the weather, the clinician pondering vaccination would do well to follow Nike’s less poetic synopsis of Ecclesiastes – “Just do it.”

This influenza season, CDC surveillance data show a large predominance of influenza A H3N2 and antigenic characterization shows that about 70% of isolates are a “drifted” strain from the H3N2 included in the seasonal vaccine (by contrast, there is a good match for the influenza A H1N1 and influenza strains).<sup>1</sup> And in a January 16, *Morbidity and Mortality Weekly Report*, CDC provided an early season estimate of influenza vaccine effectiveness against medically attended influenza as 23%.<sup>2</sup> Yet, despite the low estimate this year and uncertainty each year, the best practice for pediatricians is to plan for and implement annual vaccination for **all** patients  $\geq 6$  months old. The rationales for vaccination of children are manifold:

- Children experience the highest attack rate of influenza and are most likely to spread it to others
- Influenza among children is more often medically attended than for other age groups
- After persons  $\geq 65$  years old, the highest incidence of influenza hospitalization occurs among children between 0 and 4 years old
- Although over half of children hospitalized for influenza have an underlying high-risk condition (most often asthma), 43% of children in this group had no underlying illness<sup>3</sup>
- A substantial portion of influenza infections are acquired in the household; vaccinating children reduces infection among household contacts who may be at high-risk for severe disease

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<sup>1</sup> CDC. Weekly US influenza surveillance report: 2014-2015 Influenza Season Week 52 ending December 27, 2014. <http://www.cdc.gov/flu/weekly/>.

<sup>2</sup> Flannery B, Clippard J, Zimmerman RK. Early estimates of seasonal influenza vaccine effectiveness – United States, January 2015. *Morbidity and Mortality Weekly Report* 2015;64:10-15.

<sup>3</sup> American Academy of Pediatrics. Policy statement: recommendations for prevention and control of influenza in children, 2014-2015. *Pediatrics* 2014;134:1-19

CDC modeled influenza cases and hospitalizations prevented by vaccination each season from 2005 to 2011. Annual vaccine effectiveness was not perfect in any season – among children 0-4 years old ranging from 42.1 – 68.0%, with average coverage of 46.6%. Nevertheless, the average annual number of cases prevented in this age group was over 473,000 with an annual average of more than 3,300 hospitalizations averted.<sup>4</sup> Because pediatricians need to order vaccine well before the influenza season, absent knowledge of disease severity or vaccine match, committing to complete influenza vaccination and implementing strategies to achieve that goal is the best approach to prevention. Strategies to ensure vaccination of children at routine visits such as standing orders, reminders to all families in the practice, “vaccination only” visits, and after hours and weekend clinics all are effective approaches to achieve high coverage. Helpful information for clinicians on a range of influenza vaccination and prevention issues can be found in the AAP Policy Statement, Recommendations for Prevention and Control of Influenza in Children, 2014-2015, <http://pediatrics.aappublications.org/content/early/2014/09/17/peds.2014-2413>.

In California, rates of influenza increased throughout December, 2014, to the present. Despite the low estimate of vaccine effectiveness, children should continue to be vaccinated as the opportunity to prevent or potentially reduce the severity of illness still exists. At the same time, given the decreased vaccine effectiveness due to the drifted H3N2 strain, effective communication with parents is important to manage expectations and ensure that other approaches to prevention are also taken. If parents specifically ask about drifted virus and this year’s vaccine, pediatricians can emphasize the following:

- The vaccine still is partially effective, preventing illness or reducing its severity;
- Other circulating influenza viruses are good matches with those in the vaccine and prevention of these likely is good;
- Vaccination remains the best way to prevent influenza – making a strong recommendation for vaccination is key for many parents.

Additionally, remind parents that because vaccination is not always effective, influenza and other flu-like illnesses can be prevented by consistently adopting good behaviors such as covering coughs and sneezes, washing hands, and staying away from others when sick.

When influenza-like illnesses occur despite vaccination and good preventive behaviors, antiviral drug treatment is important to reduce morbidity. The AAP recommends antiviral drug treatment using a neuraminidase inhibitor for: 1) any child hospitalized with presumed influenza, regardless of immunization status or time after illness onset; 2) presumed influenza in a child at high risk of complications including children <2 years old; and 3) any otherwise healthy child with influenza infection for whom a decrease in duration of clinical symptoms is felt to be warranted.<sup>3</sup> Clinical benefit is greatest when antiviral treatment is started early, ideally within 48 hours of symptom onset. However, antiviral treatment likely still has some benefit in patients with severe, complicated, or progressive illness even when started >48 hours of illness onset. Oseltamivir is available in both capsule and suspension

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<sup>4</sup> Kostova D, Reed C, Finelli L, et al. Influenza illness and hospitalizations averted by influenza vaccination in the United States, 2005-2011. PLoS ONE 8(6): e66312. doi:10.1371/journal.pone.0066312, 2013.

formulations (and if the latter is not available, it can be prepared by a retail pharmacist). National data so far for the 2014-15 season show no antiviral resistance among isolates tested at CDC.<sup>1</sup>

Preventing influenza and reducing its impact are key public health and clinical goals. Although we wish for a vaccine that is effective against all strains and protects across multiple years, the ideal cannot be the enemy of the good. Just as a farmer plants every year despite uncertainty as to the yield, so too should pediatricians sow vaccine to reap prevention. And just as a farmer plants the entire field, not just the parts where the most crops will grow, so too should the pediatrician plan to vaccinate her/his entire patient population maximizing the benefits for families and society.